Evidence of a Chemical Reaction – Heat

Name: _____ Date: _____ Period: _____

Purpose*:* To identify if a chemical reaction has occurred by observing possible _____ or _____ property changes, and to determine if the _____ of substance affects reactivity. Finally, to determine whether or not a _____ aids in the speeding up or slowing down of a chemical reaction.

Research*:*

Decompose = _____

Synthesize = _____

Catalyst = _____

Hydrogen Peroxide (_____) is a type of _____, has a pH of _____, and naturally decomposes into _____ and _____.

Baker's Yeast is a(n) _____ organism. Species Name: _____

_____

Experiment: ***Safety Issues:***

***Stay With Your Group At All Times!**

***Do not** take your safety goggles off at all during this experiment!

*Lab aprons **Must Stay On At All Times** throughout the experiment.

***Wear lab gloves throughout the experiment, or you run the risk of being burned chemically**!

Materials:

- 500ml Florence Flask
- Graduated Cylinder
- Mystery Liquid, Powder or Yeast
- Warm Water
- Measuring Table Spoon
- H_2O_2 (30%)
- Dish Soap
- Food Coloring (optional)
- Glass Stirring Rod
- Apron
- Goggles (NO GLASSES)
- Latex/Nitrile Gloves
- Wood Splint

Procedures*:* ***Remember*** ⇧ ***Safety First!!!***

1. Prepare yourself for this lab by putting on your goggles, apron and lab gloves on. ***IF YOU KNOW THAT YOU ARE ALLERGIC TO LATEX GLOVES, PLEASE LET YOUR TEACHER KNOW IMMEDIATELY, AND I WILL MAKE SURE TO EXCHANGE YOUR GLOVES FOR NITRILE GLOVES.***
2. Measure 75 ml of H_2O_2 with graduated cylinder; pour into flask; add a few drops of dishwashing liquid into flask.
3. If using yeast, add one tablespoon of yeast to three tablespoons warm water; mix for about 30 seconds.
4. If using mystery powder, get one scoop of powder using metal scooper, and place into small cup.
5. If using mystery solution, obtain the solution from your instructor, and go back to your seat.
6. If your group chooses, add 3-5 drops of food coloring into flask; mix with glass rod **without** creating bubbles.
7. Place flask into the white lab materials container; make sure that the butcher paper is secured over your table.
8. Add the mystery solution, powder or yeast into your flask, and move away.
9. Record your observations & the observations of the other groups; use extreme caution, as gloves may not completely protect you from effects of the H_2O_2 solution.
10. Light candle, then light wood splint; blow out flame; it should be glowing red, place splint into experiment; observe and repeat.
11. Use extreme caution while cleaning/drying lab materials, including container; rinse gloves before removing.

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Properties of your Materials	Observations when Chemicals were Mixed	Glowing Splint Observation <u>after</u> Yeast was Added	Identity of Products (Your Ideas)	Experiment Results by Table (observe and record below)
<u>Hydrogen Peroxide:</u> **<u>Substance (yeast, powder, or solution):</u>**			**<u>Liquid Possibility:</u>** _____ _____ **<u>Substance Possibility:</u>** _____ _____ **<u>Gas Possibility:</u>** _____ _____	**<u>Table 1:</u>** **<u>Table 2:</u>** **<u>Table 3:</u>** **<u>Table 4:</u>** **<u>Table 5:</u>** **<u>Table 6:</u>** **<u>Table 7:</u>** **<u>Table 8:</u>**

<u>Analysis:</u>

1. Did you observe any evidence of a chemical reaction? Explain in detail.

_____

_____

2. Was there excessive gas present inside/outside of the flask? How were able to determine this conclusion? _____

_____

_____

3. Using **Table 2** and based on your observations, what is the official identity of the unknown gas from the reaction? Explain: _____

_____

_____

<u>Table 2: Properties of Know Gases</u>

Carbon Dioxide (CO_2) – Clear; colorless; odorless; Nonflammable; puts out fire
Oxygen (O_2) – Clear; colorless; odorless; burns fuel on continuous basis.
Hydrogen (H_2) – Clear; colorless; odorless; dramatically flammable.

4. Which chemical was the catalyst your experiment? What did the Catalyst do? Explain your understanding. _____

_____

_____

_____

Conclusion:

1. Why do you think that we used this type of flask for this experiment, rather than the flask we've been using all year? Explain your answer.

_____
_____
_____

2. Why do you think some of the other tables had higher or lower reactions? Explain your answer in detail. _____
_____
_____

3. Why do you think this reaction created so much heat? Was this reaction endothermic or exothermic? _____
_____
_____

4. The chemical equation for this experiment is listed below. Balance this equation:

5. What type of chemical reaction occurred in the lab today? How do you know?
(Choices: Synthesis Reaction (building up), Decomposition Reaction, or Replacement Reaction)

_____
_____
_____

6. One of the chemicals used in this experiment is also the primary chemical used in Liquid Rocket Fuel. Can you guess which one would be useful and why? _____
_____
_____
_____